

19. The ballast of Claim 16, wherein the power supplied to said at least one ultraviolet lamp decreases the further the pulse frequency deviates from the resonance frequency and wherein the pulse frequency is varied substantially within a second range of 50kHz to 1 MHz to control the power supplied to said at least one ultraviolet lamp.

5

20. The ballast of Claim 17, wherein the power supplied to said at least one ultraviolet lamp decreases the further the pulse frequency deviates from the resonance frequency and wherein the pulse frequency is varied substantially within a second range of 150 kHz to 200 kHz to control the power supplied to said at least one ultraviolet lamp.

10

21. The ballast of Claim 18, wherein the power supplied to said at least one ultraviolet lamp decreases the further the pulse frequency deviates from the resonance frequency and wherein the pulse frequency is varied substantially within a second range of 150 kHz to 200 kHz to control the power supplied to said at least one ultraviolet lamp.

15

22. The ballast of Claim 15, wherein the resonant circuit comprises a capacitance and an inductance in series.

20

23. The ballast of Claim 15, wherein the resonance frequency is set at greater than 50 kHz for reduced size of components so that the width of a ballast sleeve of the ballast is substantially the same as the width of a lamp sleeve of an ultraviolet lamp

25

24. A ballast module for use in a fluid treatment assembly having a frame to support at least one ultraviolet lamp under the control of an assembly control unit, the ballast module comprising:

30

a ballast for converting electrical energy to a form suitable to power at least one ultraviolet lamp; and

a control section for interfacing with the assembly control unit and controlling said ballast under direction of the assembly control unit.

5 25. The ballast module of Claim 24, wherein the ballast comprises:  
a resonant circuit having a resonance frequency for generating an  
alternating voltage source to power said at least one ultraviolet lamp;  
a driver circuit having a pulse frequency for supplying the resonant  
circuit with pulses of electrical energy;  
wherein the resonance frequency is set in excess of 50 kHz.

10 26. The ballast module of Claim 25, wherein the resonance frequency is  
substantially set in a first range of 50kHz to 1 MHz.

15 27. The ballast module of Claim 25, wherein the resonance frequency is  
substantially set in a first range of 100 kHz to 150 kHz.

20 28. The ballast module of Claim 25, wherein the resonance frequency is  
substantially set in a first range of 200 kHz to 250 kHz.

25 29. The ballast module of Claim 26, wherein the power supplied to said at  
least one ultraviolet lamp decreases the further the pulse frequency deviates  
from the resonance frequency and wherein the pulse frequency is varied  
substantially within a second range of 50kHz to 1 MHz to control the power  
supplied to said at least one ultraviolet lamp.

30 30. The ballast module of Claim 27, wherein the power supplied to said at  
least one ultraviolet lamp decreases the further the pulse frequency deviates  
from the resonance frequency and wherein the pulse frequency is varied  
substantially within a second range of 150 kHz to 200 kHz to control the  
power supplied to said at least one ultraviolet lamp.

31. The ballast module of Claim 28, wherein the power supplied to said at least one ultraviolet lamp decreases the further the pulse frequency deviates from the resonance frequency and wherein the pulse frequency is varied substantially within a second range of 150 kHz to 200 kHz to control the power supplied to said at least one ultraviolet lamp.

32. The ballast module of Claim 24, further comprising a power factor section to substantially synchronize the voltage and current of the electrical energy as viewed by an electrical energy monitor.

10

33. The ballast module of Claim 24, further comprising a monitor section for monitoring the ballast module and said at least one ultraviolet lamp, and reporting to said assembly control unit.

15

34. The ballast module of Claim 25, wherein the resonance frequency is set at greater than 50 kHz for reduced size of components so that the width of a ballast sleeve is substantially the same as the width of a lamp sleeve of said at least one ultraviolet lamp.

20

35. A method of photochemically treating a fluid using a fluid treatment assembly, comprising

immersing a plurality of ultraviolet lamps in the fluid when the assembly is in use;

powering said ultraviolet lamps using a plurality of ballast modules,

25

each of said ballast modules having a ballast electrically connected to at least one ultraviolet lamp for powering said at least one ultraviolet lamp, the ballast having a resonant circuit with a resonance frequency for generating an alternating voltage source to power said at least one ultraviolet lamp and a driver circuit with a pulse frequency for supplying the resonant circuit with pulses of electrical energy;

supporting said ultraviolet lamps and said ballast modules in a frame member having a portion adapted to be immersed in the fluid when the

2010 RELEASE UNDER E.O. 14176